Lloyd's Register

Rules and Regulations for the Classification of Ships, July 2006

Notice No. 7

Updated version of Notice No. 7 incorporating Errata Note

Effective Date of Latest Amendments:

See page 1

Issue date: June 2007

RULES AND REGULATIONS FOR THE CLASSIFICATION OF SHIPS, *July 2006*

Notice No. 7

This Notice contains amendments within the following Sections of the *Rules and Regulations for the Classification of Ships, July 2006.* The amendments are effective on the dates shown:

Part	***Chapter***	***Section***	***Effective date***
1	2	Contents	Corrigenda
1	2	2	Corrigenda
1	3	2, 5	1 July 2007
1	3	8, 9	1 January 2007
3	1	6	Corrigenda
3	4	5	1 July 2007
4	7	9	Corrigendum
4	9	1	1 January 2007
5	1	4	1 July 2007
5	10	1	1 July 2007
5	12	5	1 January 2007
5	13	1	1 July 2007
5	13	12	Corrigendum
5	14	3	1 July 2007
5	14	9	Corrigenda
6	1	3	1 July 2007
6	1	3	Corrigendum
6	2	2	Corrigendum

The *Rules and Regulations for the Classification of Ships, July 2006* are to be read in conjunction with this Notice No. 7. The status of the Rules is now:

Rules for Ships	Effective date:	July 2006
Notice No. 1	Effective dates:	1 April, 1 July 2006 & Corrigenda
Notice No. 2	Effective date:	1 January 2007
Notice No. 3	Effective date:	1 July 2006 & Corrigenda
Notice No. 4	Effective date:	1 January 2007 & Corrigenda
Notice No. 5	Effective date:	1 January, 1 July 2007 & Corrigenda
Notice No. 6	Effective date:	1 July 2006 & 1 January, 1 July 2007 & Corrigenda
Notice No. 7	Effective date:	1 Januany 2007, 1 July 2007 & Corrigenda

Part 1, Chapter 2

Classification Regulations

CORRIGENDA

■ Contents

(Part only shown)

■ *Section 2*
Character of classification and class notations

2.5 Class notations (refrigerated cargo installations (RMC), controlled atmosphere (CA) systems and carriage of refrigerated containers ~~in holds~~ (~~CRCH~~)CRC))

2.5.3 The following class notation is associated with the carriage of refrigerated cargo containers ~~in holds~~ and may be assigned as considered appropriate by the Committee, on application from Owners, *see also* Pt 7, Ch 10:

✠ **~~CRCH~~ CRC** This notation may be assigned when a ship is provided with a ventilation system which is approved, installed and tested in accordance with the relevant requirements of the Rules.

Part 1, Chapter 3

Periodical Survey Regulations

Effective date 1 July 2007

■ *Section 2*
Annual Surveys - Hull and machinery requirements

2.2 Annual Surveys

2.2.33 For single hold general dry cargo ships, other than bulk carriers, fitted with water level detectors in the cargo hold, an examination and a test, at random, of the water ingress detection system and alarms are to be carried out.

■ *Section 5*
Special Survey - General - Hull requirements

5.4 Overall Survey

5.4.6 For single hold general dry cargo ships, other than bulk carriers, fitted with water level detectors in the cargo hold, an examination and a test of the water ingress detection system and alarms are to be carried out.

Effective date 1 January 2007

■ *Section 8*
Special Survey - Chemical tankers - Hull requirements

8.5 Testing

8.5.1 The minimum tank testing requirements are given in Table 3.8.1 and, where required, the ~~at each Special Survey are as follows:~~

~~(a) All ballast tank boundaries.~~

~~(b) Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams.~~

~~The~~ Surveyor may extend the tank testing if deemed necessary. Other arrangements for cargo tank testing will be considered on application. The remaining requirements for tank testing, as applicable, are given in 5.3.5.

Table 3.8.1 Tank testing requirements – Chemical ships

Special Survey I (Ships 5 years old)	Special Survey II and subsequent (Ships 10 years old and over)
All ballast tank boundaries Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams	All ballast tank boundaries All cargo tank bulkheads

8.7 Thickness measurement

8.7.2 In areas where substantial corrosion, as defined in 1.5, has been noted, then additional measurements are to be carried out, as applicable, in accordance with Tables ~~3.8.3,~~ 3.8.4, 3.8.5 ~~and~~ ,3.8.6 and 3.8.7 to determine the full extent of the corrosion pattern. The survey will not be considered complete until these additional thickness measurements have been carried out.

Existing tables 3.8.1 *to* 3.8.6 *have been renumbered* 3.8.2 *to* 3.8.7.

■ *Section 9*
Ships for liquefied gases

9.1 General

9.1.3 ~~A survey book or other permanent record is to be kept on board ship to show the date of examination of the various parts. This is to be available to the Surveyor at all times and is to be signed by the Surveyor at each survey.~~ The following documentation, as applicable, is to be available on board the ship:

(a) Relevant instruction and information material such as cargo handling plans, filling limit information, cooling down procedures, etc.
(b) A copy of the IGC Code.
(c) Test records of secondary barrier.
(d) Loading and stability information, including damage stability.

9.2 Annual Surveys - Basic requirements

9.2.1 The Annual Survey is preferably to be carried out during a loading or discharging operation. Access to cargo tanks or inerted hold spaces, necessitating gas-freeing/aerating will normally not be necessary unless required by the Regulations.

~~*9.2.1*~~ *9.2.2* The ship's log and operational records for the cargo containment system covering the period from the previous survey are to be examined. Any malfunction of the system entered in the log is to be investigated, the cause ascertained, and that part of the system at fault is to be found or placed in good order.

~~*9.2.2*~~ *9.2.3* ~~Cargo liquid level indicating devices are to be generally examined. The low level, high level, and overfill alarms are to be examined and tested to ascertain that they are in working order. Consideration will be given to the acceptance of simulated tests, provided that they are carried out at the cargo temperature, or comprehensive maintenance records, including details of tests held, in accordance with the cargo plant instrumentation maintenance manual.~~ Instrumentation and safety systems are to be surveyed as follows:

(a) The instrumentation of the cargo installations with regard to pressure, temperature and liquid level is to be verified in good working order by one or more of the following methods:
  (i) Visual external examination.
  (ii) Comparing of read outs from different indicators.
  (iii) Consideration of read outs with regard to the actual cargo and/or actual conditions.
  (iv) Examination of maintenance records with reference to cargo plant instrumentation maintenance manual.
  (v) Verification of calibration status of the measuring instruments.
(b) The low level, high level, and overfill alarms are to be examined and tested to ascertain that they are in working order.

(c) The alarms associated with the following are to be tested as applicable:
  (i) Cargo tank high and low pressure.
  (ii) Cargo tank temperature.
  (iii) Cargo hold pressure.
  (iv) Interbarrier space pressure.
  (v) Inner hull temperature.
  vi) Secondary barrier temperature.
  (vii) Cargo Hold or Interbarrier bilge level detection.

(d) Control devices for the cargo containment systems and cargo handling equipment, together with any associated shutdown and/or interlock, are to be checked under simulated working conditions and, if necessary, recalibrated. Such safety systems include but are not limited to:
  (i) Cargo tank overfill protection including cargo pump, compressor and other cargo machinery automatic shutdown.
  (ii) Cargo pump, compressor and other cargo machinery shutdown on low cargo tank pressure or cargo tank and interbarrier/hold space differential pressure.
  (iii) Cargo pump automatic shutdown on low level or current;

(e) The emergency shutdown system is to be tested, without flow in the pipe lines, to verify that the system will cause the cargo pumps, compressors and other cargo machinery, as applicable, to stop.

(f) Consideration will be given to the acceptance of simulated tests, provided that they are carried out at the cargo temperature, or comprehensive maintenance records, including details of tests held, in accordance with the cargo plant instrumentation maintenance manual.

~~*9.2.3*~~ *9.2.4* Cargo gas leakage detection systems are to be examined and tested to ascertain that they are in working order and calibrated using sample gas.

~~*9.2.4 The correct functioning of the cargo containment system temperature indicating equipment, together with any associated alarms, is to be verified*~~.

9.2.5 ~~Inert gas systems for the environmental control of the cargo tanks and hold spaces are to be generally examined as required by 2.2.24.~~ Inert gas/dry air installations including the means for prevention of backflow of cargo vapour to gas-safe spaces are to be verified as being in satisfactory operating condition.

~~*9.2.6 Control devices for the cargo containment systems and cargo handling equipment, together with any associated shutdown and/or interlock, are to be checked under simulated working conditions and, if necessary, recalibrated.*~~

~~*9.2.7 The arrangements for manually operated emergency shutdown are to be checked to ascertain that they are in working order.*~~

~~*9.2.8*~~ *9.2.6* Ventilation systems and air locks in working spaces are to be checked for satisfactory operation.

~~*9.2.9*~~ *9.2.7* Cargo pipeline, valves and fittings are to be generally examined, with special reference to expansion bellows, supports and vapour seals on insulated pipes. It is to be verified that all accessible cargo piping systems are electrically bonded to the hull.

~~*9.2.10*~~ *9.2.8* Portable and/or fixed drip trays, or insulation for deck protection in the event of cargo leakage, are to be examined for condition.

9.2.9 The means for accomplishing gas tightness of the wheelhouse doors and windows is to be examined. All windows and side-scuttles within the area required to be of the fixed type (non-opening) are to be examined for gas tightness. The closing devices for all air intakes and openings into accommodation spaces, service spaces, machinery spaces, control stations and approved openings in superstructures and deckhouses facing the cargo area or bow and stern loading/unloading arrangements are to be examined. For ships carrying toxic gases such devices should be capable of being operated from inside the space.

9.2.10 Venting systems, including protection screens if provided, for the cargo tanks, inter-barrier spaces and hold spaces are to be visually examined externally. It is to be verified that the cargo tank relief valves are sealed and that the certificate for the relief valves opening/closing pressures is on board the ship.

9.2.11 Mechanical ventilation fans in gas dangerous spaces and zones are to be visually examined. Adequate spare parts should be carried for each type of fan installed.

9.2.12 Electrical equipment, cables and supports in gas dangerous zones shall be examined as far as practicable. Alarms and safety systems associated with pressurised lighting systems and any safety device associated with non-safe type electrical equipment that is protected by air-locks are to be verified.

9.2.13 Heating arrangements, if fitted, for cofferdams and other spaces shall be verified in good working order.

9.2.14 All accessible gas-tight bulkhead penetrations including gas-tight shaft sealings are to be visually examined.

9.2.15 The sealing arrangements for tanks or tank domes penetrating decks or tank covers are to be externally examined.

9.3 Annual Surveys - Reliquefaction/refrigeration equipment

(Part only shown)

9.3.1 Where reliquefaction or refrigeration equipment for cargo temperature and pressure control is fitted, ~~and the notation ✠**Lloyd's RMC(LG)** assigned,~~ the following are to be examined, so far as practicable:

9.5 Annual Surveys - Cargo containment systems

~~*9.5.1 At the first Annual Survey after initial commissioning of the ship, the operating records of the primary gas detection systems are to be examined.*~~

~~9.5.2~~ *9.5.1* Where the insulation arrangement is such that the insulation cannot be examined, the surrounding structures of wing tanks, double bottom tanks and cofferdams are to be examined for cold spots, prior to the survey. This examination is to be held at a convenient cargo discharge operation with the cargo tanks loaded at approximately the minimum notation temperature.

~~9.5.3~~ *9.5.2* On application by the Owner, consideration will be given to the cold spot examination, where applicable, being carried out by the ship's staff.

~~9.5.4~~ *9.5.3* When tests are required after repairs, independent cargo tanks, other than independent tanks Type C, are to be tested by hydraulic or hydropneumatic means as appropriate. Test heads and pressures should be as defined in Ch 4,10 of the Rules for Liquefied Gases. Cargo tanks of the membrane or semi-membrane type are to be tested by means of a detectable gas in the inter-barrier spaces and discolouring paint on the weld seams of the cargo tanks wall, or other suitable means. Independent cargo tanks of Type C are to be tested hydraulically at 1,25 times the approved maximum vapour pressure.

9.6 Intermediate Surveys

9.6.1 The Intermediate Survey intends to supplement the Annual Survey by testing cargo handling installations with related automatic control, alarm and safety systems for correct functioning. The Intermediate Survey is preferably to be carried out with the ship in a gas-free condition. The extent of the testing required for the Intermediate Survey will normally be such that the survey cannot be carried out during a loading or discharging operation.

~~9.6.1~~ *9.6.2* In addition to the requirements for Annual Survey and the requirements of 3.2.1 to 3.2.8, the following are to be dealt with as applicable:

(a) Examination of means for draining the vent piping system.

(b) Verification that pipelines and cargo tanks are electrically bonded to the hull.

(c) Verification that the heating arrangements, if any, for steel structures are satisfactory.

~~(d) With regard to the cargo containment systems, examination of the items in accordance with 9.5.1 and 9.5.2, except that membrane type tanks do not need to be examined internally.~~

~~(c)~~ (d) Where required by the manufacturer's maintenance instructions, cargo ~~Cargo~~ tank and inter-barrier space pressure and vacuum relief valve settings are to be checked and adjusted as required. Cargo tank pressure relief valve harbour settings are also to be checked, if applicable. ~~A check is to be made that cargo~~ Cargo tank pressure relief valves ~~will~~ are to lift at a pressure not more than the percentage given below, above the maximum vapour pressure for which the tanks have been approved.

- For 0 to 1,5 bar (0 to 1,5 kgf/cm^2), 10 per cent.
- For 1,5 to 3,0 bar (1,5 to 3,0 kgf/cm^2), 6 per cent.
- For pressures exceeding 3,0 bar (3,0 kgf/cm^2), 3 per cent.
- Valves may be removed from the tanks for the purpose of checking.

~~(f)~~ (e) A General Examination within the areas deemed as dangerous such as cargo compressor rooms and spaces adjacent to and zones above cargo areas, for defective and non-certified safe-type electrical equipment, improperly installed, defective and dead wiring. An electrical insulation resistance test of the circuits terminating in, or passing through the dangerous areas, is to be carried out. If the ship is not in a gas free condition the results of previously recorded test readings may be accepted. ~~Valves may be removed from the tanks for the purpose of checking.~~

~~9.6.2~~ *9.6.3* At the first Intermediate Survey after initial commissioning of the ship, the following examinations are to be carried out:

(a) Cargo tanks, other than independent tanks, ~~Type~~ Types A and C, are to be examined internally. ~~and (where possible) externally, and the insulation~~ Insulation, where fitted externally, is to be generally examined.

(b) Particular attention is to be given to tower structures and other attachments within the tanks, tank supports and securing arrangements.

9.7 Special Survey I (ships five years old) - General requirements

9.7.2 The requirements for Close-up Survey and thickness measurements are given in ~~9.11~~ 9.12 and ~~9.12~~ 9.13.

9.7.3 All cargo tanks are to be examined internally, also externally so far as practicable, particular attention being paid to the plating in way of supports of securing arrangements, tower structures, seatings and pipe connections, also to sealing arrangements in way of the deck penetrations. Provided that the structural examination is satisfactory, that the gas leakage monitoring systems have been found to be operating satisfactorily and that the voyage records have not shown any abnormal operation, cargo tanks do not require to be hydraulically tested. The primary membranes of 'Gas Transport' design should be examined with the primary insulation space under a vacuum of at least -500 mbar gauge. For 'Moss Type' LNG cargo tanks, the Structural Transition Joints (STJ) are to be examined at the port, starboard, forward and aft locations. Insulation is to be removed as required. Non-destructive testing may be required where considered necessary.

9.7.4 ~~Independent cargo tanks of Type C are to be subjected to non-destructive testing of the plating in way of supports and also at selected lengths of welds. Where such testing raises doubt as to the structural integrity, a hydraulic test should be carried out at 1,25 times the approved maximum vapour pressure. Alternatively, consideration will be given to pneumatic testing under special circumstances provided full details are submitted for approval.~~ The non-destructive testing of cargo tanks is to be carried out as follows:

(a) Non-destructive testing is to supplement cargo tank inspection with special attention to be given to the integrity of the main structural members, tank shell and highly stressed parts, including welded connections as deemed necessary by the Surveyor. The following items are, inter alia, considered as highly stressed parts:
  (i) Cargo tanks supports and anti-rolling/anti-pitching devices;
  (ii) Web frames or stiffening rings;
  (iii) Swash bulkhead boundaries;
  (iv) Dome and stump connections to tank shell;
  (v) Foundations for pumps, towers, ladders, etc.;
  (vi) Pipe connections.

(b) For independent tanks of Type B, the extent of non-destructive testing shall be as given in the programme specially prepared for the cargo tank design.

(c) Independent cargo tanks of Type C are to be subjected to non-destructive testing of the plating in way of supports and also at selected lengths of welds. Where such testing raises doubt as to the structural integrity, a hydraulic test should be carried out at 1,25 times the approved maximum vapour pressure. Alternatively, consideration will be given to pneumatic testing under special circumstances, provided full details are submitted for approval.

(d) At each alternate Special Survey (i.e. SSII, SSIV and so on), all independent cargo tanks of Type C are to be either:
  (i) Hydraulically or hydro-pneumatically tested to 1.25 times MARVS, followed by non-destructive testing in accordance with paragraph (a) above, or,
  (ii) Subjected to a thorough, planned, non-destructive testing. This testing is to be carried out in accordance with a programme specially prepared for the tank design. If a special programme does not exist, the following applies:
    - cargo tank supports and anti-rolling/anti-pitching devices;
    - stiffening rings;
    - Y-connections between tank shell and a longitudinal bulkhead of bi-lobe tanks;
    - swash bulkhead boundaries;
    - dome and sump connections to the tank shell;
    - foundations for pumps, towers, ladders etc.;
    - pipe connections.

At least 10 per cent of the length of the welded connections in each of the above mentioned areas is to be tested. This testing is to be carried out internally and externally as applicable. Insulation is to be removed as necessary for the required non-destructive testing.

9.7.6 Secondary barriers are to be examined for their effectiveness, visually whenever possible, or by means of pressure/vacuum tests on the inter-barrier spaces~~, over a period of 36 hours~~ Testing is to be carried out in accordance with the system designer's requirements as approved by LR. Alternative means of checking the secondary barriers will be considered.

9.7.8 Where a cargo tank or the hull structure is insulated and the insulation is accessible, the insulation should be examined externally, together with any vapour or protective barrier, and sections removed for examination, if considered necessary by the Surveyor. Special attention should be given to insulation in way of chocks, supports and keys. Portions of the insulation are also to be removed, if required by the Surveyor, to enable the condition of the plating to be ascertained. Where the insulation is not accessible, *see* ~~9.5.2~~ 9.5.1.

9.7.10 ~~Pressure relief valves and vacuum relief valves on cargo tanks and inter-barrier spaces are to be opened out for inspection. Pressure relief valves are subsequently to be adjusted to lift at a pressure in accordance with 9.6.1(e). Relief valve harbour settings are to be checked, if applicable. Valves may be removed from the shell for the purpose of making this adjustment under pressure of air or other suitable gas. Relief valves on cargo gas and liquid pipelines are to have their pressure settings checked. The valves may be removed from the pipelines for this purpose.~~ Relief valves are to be surveyed as follows:

(a) The pressure relief valves for the cargo tanks are to be opened for examination, adjusted, function tested, and sealed. If the cargo tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such non-metallic membranes are to be replaced.

(b) Pressure relief valves are subsequently to be adjusted to lift at a pressure in accordance with 9.6.2(d). Relief valve harbour settings are to be checked, if applicable. Valves may be removed from the shell for the purpose of making this adjustment under pressure of air or other suitable gas.

(c) Where a proper record of continuous overhaul and retesting of individually identifiable relief valves is maintained, consideration will be given to acceptance on the basis of opening, internal examination, and testing of a representative sampling of valves, including each size and type of liquefied gas or vapour relief valve in use, provided there is logbook evidence that the remaining valves have been overhauled and tested since crediting of the previous Special Survey.

(d) Relief valves on cargo gas and liquid pipelines are to have their pressure settings checked. The valves may be removed from the pipelines for this purpose. At the Surveyor's discretion a sample of each size and type of valve may be opened for examination and testing.

9.10 Special Survey II and Special Surveys thereafter (ships 10 years old and over)

9.10.5 The requirements for Close-up Survey and thickness measurement are given in ~~9.11~~ 9.12 and ~~9.12~~ 9.13.

9.11 Special Survey III and Special Surveys thereafter (ships 15 years old and over)

9.11.1 The requirements of 9.1 to 9.10 are to be complied with.

9.11.2 For independent tanks of Type B, the Owner is to submit proposals for the extent of non-destructive testing of the cargo tanks well in advance of the Special Survey.

~~9.11~~ 9.12 Close-up Survey

~~9.11.1~~ 9.12.1 The minimum requirements for Close-up Survey are given in Table 3.9.1.

~~9.11.2~~ 9.12.2 The Surveyor may extend the Close-up Survey, if deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and the structural arrangements or details which have suffered defects in similar spaces or on similar ships.

~~9.11.3~~ 9.12.3 For areas in tanks where coatings are found to be in GOOD condition, as defined in 1.5, the extent of Close-up Survey may be specially considered.

~~9.12~~ 9.13 Thickness measurement

~~9.12.1~~ 9.13.1 The minimum requirements for thickness measurement are given in Table 3.9.2.

~~9.12.2~~ 9.13.2 In areas where substantial corrosion, as defined in 1.5, has been noted, then additional measurements are to be carried out, as applicable, in accordance with the appropriate Tables in Section 6 or 7 (depending on the structural configuration of the ship) to determine the full extent of the corrosion pattern. The survey will not be considered complete until these additional thickness measurements have been carried out.

Part 3, Chapter 1
General

CORRIGENDA

■ *Section 6*
Definitions

6.1 Principal particulars

6.1.11 Bow reference height, H_b, is defined as:
For ships less than 250 m in length:

$$H_b = 0{,}056L_L \left(1 - \frac{L_L}{500}\right)\left(\frac{1{,}36}{C_{bL} + 0{,}68}\right) \text{ m}$$

For ships ~~less than~~ 250 m or greater in length:

$$H_b = 7\cancel{L_L}\left(\frac{1{,}36}{C_{bL} + 0{,}68}\right) \text{ m}$$

where
L_L is defined in 6.1.8

Part 3, Chapter 4
Longitudinal Strength

Effective date 1 July 2007

■ *Section 5*
Hull bending strength

5.3 Design still water bending moments

5.3.5 Ballast loading conditions involving partially filled peak and/or other ballast tanks at departure, arrival or during intermediate conditions are not permitted as design conditions unless the design stress limits are satisfied for all filling levels between empty and full, and for bulk carriers the requirements of Pt 4, Ch 7,3, as applicable, are to be complied with for all filling levels between empty and full. ~~However, for the purpose of the design, it will be acceptable if, in each condition at departure, arrival and, where required in 5.3.3 and 5.3.4, any intermediate condition, the tanks intended to be partially filled are assumed to be empty and full. In addition, the specified partly filled level in the intended condition is to be considered.~~

To demonstrate compliance with all filling levels between empty and full, it will be acceptable if, in each condition at departure, arrival and where required by 5.3.3, any intermediate condition, the tanks intended to be partially filled are assumed to be:

- empty
- full
- partially filled at intended level.

Where multiple tanks are intended to be partially filled, all combinations of empty, full or partially filled at intended level for those tanks are to be investigated. However, for conventional ore carriers with large wing water ballast tanks in cargo area, where empty or full ballast water filling levels of one or maximum two pairs of these tanks lead to the ship's trim exceeding one of the following conditions, it is sufficient to demonstrate compliance with maximum, minimum and intended partial filling levels of these one or maximum two pairs of ballast tanks such that the ship's condition does not exceed any of these trim limits. Filling levels of all other wing ballast tanks are to be considered between empty and full. The trim conditions mentioned above are:

- trim by stern of 3% of the ship's length, or
- trim by bow of 1.5% of ship's length, or
- any trim that cannot maintain propeller immersion (I/D) not less than 25%, where;

I = the distance from propeller centreline to the waterline, *see* Fig. 4.5.1

D = propeller diameter, *see* Fig. 4.5.1

The maximum and minimum filling levels of the above mentioned pairs of side ballast tanks are to be indicated in the loading manual.

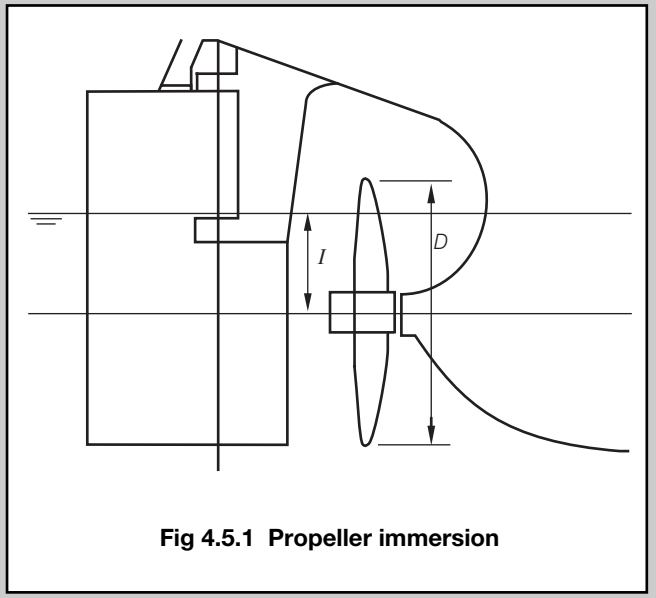

Fig 4.5.1 Propeller immersion

5.3.7 When considering ballast water exchange using the sequential method, the requirements of 5.3.5 and 5.3.6 do not apply.

Part 4, Chapter 7
Bulk Carriers

CORRIGENDUM

■ *Section 9*
Hopper side tank structure

9.3 Slopped bulkhead stiffeners

(Part only shown)

9.3.1 Where the hopper tanks are interconnected with the topside tanks, or in way of ballast holds, the scantlings of the stiffeners are also to comply with the requirements of Table 7.8.1(4)(c) and (4)(d), whichever is appropriate. For higher tensile steel longitudinals the requirements of 6.2.~~2~~ 3 are to be complied with where applicable, *see also* 9.7.1.

Part 4, Chapter 9
Double Hull Oil Tankers

Effective date 1 January 2007

■ *Section 1*
General

1.4 Class notation and applicable Rules for non-CSR Double Hull Oil Tankers

1.4.3 At the Owner's request, the notation **MARPOL 20.1.3** may be appended to the notation **100A1 Double Hull Oil Tanker** for vessels not meeting the minimum double side width (d_s) requirements of Table 9.1.1 but which comply with ~~MARPOL Regulation 13G (1)(c)~~ MARPOL Annex I, Regulation 20.1.3.

1.4.4 At the Owner's request, the notation **MARPOL 21.1.2** may be appended to the notation **100A1 Double Hull Oil Tanker** for vessels of less than 5000 tonnes deadweight which have a complete double hull in accordance with ~~MARPOL 73/78 Annex I regulation 13H(1)(b)~~ MARPOL Annex I, Regulation 21.1.2.

Part 5, Chapter 1
General Requirements for the Design and Construction of Machinery

Effective date 1 July 2007

■ *Section 4*
Machinery room arrangements

4.4 Ventilation

4.4.2 Machinery spaces shall be sufficiently ventilated so as to ensure that when machinery or boilers therein are operating at full power in all weather conditions, including heavy weather, a sufficient supply of air is maintained to the spaces for the operation of the machinery.

Part 5, Chapter 10
Steam Raising Plant and Associated Pressure Vessels

Effective date 1 July 2007

■ *Section 1*
General requirements

1.6 Plans

1.6.3 Plans, in triplicate, showing details of the air flow through the combustion chamber, boiler furnace and boiler uptake spaces, including measures taken to assure effective purging in all of the spaces, are to be submitted for consideration. *See also* Pt 6, Ch 1, 3.5 and 3.6.

1.6.4 Plans, in triplicate, showing all areas of refractory material in the combustion chamber and boiler furnace spaces, are to be submitted for consideration. *See* 1.12.1.

1.6.5 Calculations, in triplicate, showing that a minimum of 4 air changes of the combustion chamber, boiler furnace and boiler uptake spaces will be achieved during automatic purging operations, with details of the forced draft fans and arrangements of air flow from fan intake to flue outlet, are to be submitted for consideration, *see* 1.12.1.

1.6.6 Calculations, in triplicate, are to be submitted showing that the ventilation of machinery spaces containing boilers is adequate for the air consumers within the space with an unimpaired air supply, in accordance with the equipment manufacturer's recommendations, under operating conditions as defined in Ch 1, 4.4.2.

1.12 Furnace explosion prevention

1.12.1 The design of combustion chamber and furnace arrangements is to incorporate measures to minimise the risk of explosion as far as practicable. Measures are to be taken to prevent the accumulation of flammable gases in spaces which may not effectively be reached by purging air. Measures are to be taken to minimise heat retaining surfaces e.g. refractory which can become sources of ignition in the furnace and uptakes.

Part 5, Chapter 12
Piping Design Requirements

Effective date 1 January 2007

■ *Section 5*
Plastics pipes

5.4 Fire performance criteria

(Part only shown)
Table 12.5.3 Fire endurance requirements *(conclusion)*

NOTES	
10.	For tankers where compliance with ~~paragraph 3(f) of regulation 13F of Annex I of MARPOL 73/78~~ MARPOL Annex I, Regulation 19.3.6 is required, 'N/A' is to replace '0'.

Part 5, Chapter 13
Ship Piping Systems

Effective date 1 July 2007

■ *Section 1*
General requirements

1.3 Plans and particulars

1.3.1 The following plans (in diagrammatic form) and particulars are to be submitted for approval. Additional plans should not be submitted unless the arrangements are of a novel or special character affecting classification:

(a) Arrangements of air pipes and closing devices for all tanks and enclosed spaces.
(b) Sounding arrangements for all tanks, enclosed spaces and cargo holds.
(c) Arrangements of level alarms fitted in tanks, cargo holds, machinery spaces, pump rooms and any other spaces.
(d) Arrangements of any cross flooding or heeling tank systems.
(e) Bilge drainage arrangements for all compartments which are to include details of location, number and capacity of pumping units on bilge service. In the case of passenger ships, the criterion numeral, as defined in the International Convention for the Safety of Life at Sea, 1974, and applicable amendments are to be stated, together with the number of flooded compartments which the ship is required to withstand under damage conditions.
(f) Ballast filling and drainage arrangements.
(g) Oil fuel filling, transfer, relief and spill/drainage arrangements.
(h) Tank overflow arrangements.
(j) Blanking arrangements for bilge and ballast piping systems for bulk carriers having floodable holds.
(k) Isolation arrangements for bilge systems where cargo holds are intended for the carriage of dangerous goods.
(l) Details verifying compliance with the sizing of air pipes required by 12.8.
(m) Arrangements of oil fuel piping in connection with oil burning installations and oil fired galleys.
(n) Arrangements of oil fuel burning units for boilers and thermal fluid heaters.
(o) Arrangement of boiler feed system.
(p) Arrangements of thermal fluid circulation systems.
(q) Arrangement of compressed air systems for main and auxiliary services.
(r) Arrangements of lubricating oil systems.
(s) Arrangements of flammable liquids used for power transmission, control and heating systems.
(t) Arrangements of cooling water systems for main and auxiliary services.
(u) Oil fuel settling service and other oil fuel tanks not forming part of the ship's structure.
(v) Arrangements and dimensions of all steam pipes where the design pressure or temperature exceeds 16,0 bar (16,3 kgf/cm^2) or 300°C, respectively, and the outside diameter exceeds 76,1 mm, with details of flanges, bolts and weld attachments, and particulars of the material of pipes, flanges, bolts and electrodes.
(w) Details verifying compliance with the capacity of the oil fuel treatment plant required by Ch 14,3.10.1.
(x) Details verifying compliance of demands on low pressure air systems by essential users as required by Ch 14,10.1.3.

CORRIGENDUM

■ *Section 12*
Air, overflow & surrounding pipes

12.7 Air pipe closing appliances

12.7.1 The closing appliances fitted to tank air pipes in accordance with Pt 3, ~~Ch 12,3~~ Ch 12, 3.3 are to be of an automatic opening type which will allow the free passage of air or liquid to prevent the tanks being subjected to a pressure or vacuum greater than that for which they are designed.

Part 5, Chapter 14
Machinery Piping Systems

Effective date 1 July 2007

■ *Section 3*
Oil fuel burning arrangements

3.1 Oil burning units

3.1.1 Where steam is required for the main propelling engines, or where steam or thermal oil is required for auxiliary machinery for essential services, or for heating of heavy oil fuel and is generated by burning oil fuel under pressure, there are to be not less than two oil burning units. ~~each unit comprising a pressure pump, a suction filter, a discharge filter and a heater.~~ For auxiliary boilers, a single oil burning unit may be accepted, provided that alternative means, such as an exhaust gas boiler or composite boiler, are available for supply~~ing steam~~ of essential ~~purposes~~ services. Where the oil burning unit is not of the monobloc type (i.e. separate register and oil supply unit), each oil burning unit is to comprise a pressure pump, suction filter, discharge filter and, when required, a heater.

~~*3.1.2*. In two unit installations, each unit is to be capable of supplying fuel for generating all the steam required for essential services.~~

~~*3.1.3*. In installations of three or more units, the capacities and arrangements of the units are to be such that all the steam required for essential services can be maintained with any one unit out of action.~~

3.1.2 In installations consisting of two or more oil burning units, the number, arrangement and capacity of such units is to be capable of supplying sufficient fuel to allow the steam to be generated or thermal oil heated, as applicable to provide essential services with any one unit out of action.

~~*3.1.4*~~ *3.1.3* Unit pressure pumps are to be entirely separate from the feed, bilge or ballast systems.

3.1.4 In dual oil fuel burning systems for boilers which are primarily designed for operation with residual fuel oil grades, arrangements are to be such that atomising steam cannot be used in combination with distillate fuel oil grades where the burner arrangements have not been designed for such use.

3.1.5 Whenever the oil fuel burning units are stopped, shut-off arrangements for oil fuel to the units are to be provided as follows:
(a) If the supply oil fuel is under pressure during shut-off to oil burning units, duplicated shut-off valves in series are to be fitted. Arrangements are to be such to allow manual testing for leakage from each of the valves in the installed condition, the test arrangement is to be such to prevent inadvertent operation, and any discharges are to be led to a safe position to ensure that discharge of leakage oil does not present an ignition hazard.
(b) If arrangements are such that oil fuel pressure is released through drainage during oil fuel shut-off to oil burning units, a single shut-off device may be accepted subject to approval by LR.

3.1.6 When combined air and fuel/steam/air combustion systems are used for multiple boiler installations, they are to be such that single boiler operation will not be adversely affected by the operation of another boiler system at any time.

3.1.7 Arrangements are to be such that furnace pre-purging is completed prior to any burner ignition sequence. The purge time is to be based on a minimum of 4 air changes of the combustion chamber, furnace and uptake spaces. The purge timing is to take account of the air flow rate and the sequence is not to commence until all air registers and dampers, as applicable, are fully open and the forced draft fans are operating.

3.1.8 The effect of multiple light-off failures is to be assessed and the need to lock out further ignition sequences established. The manufacturer's recommended procedures are to be followed before further attempts to ignite the boiler are made. These procedures are to be displayed at the ignition control positions and included in the warning notice required by 3.1.11.

3.1.9 Means are to be provided so that, in the event of flame failure, the oil fuel supply to the burner(s) is shut-off automatically, and an alarm is given, *see* Pt 6, Ch 1, 3.5 to 3.8, as applicable.

3.1.10 It is to be demonstrated to the Surveyor's satisfaction during trials that burner shut-off times due to flame failure comply with the following requirements, and details of the procedures and means used to set this time interval are to be submitted for consideration:
(a) The time interval at burner start up between the burner oil fuel valve(s) being opened and then closed in the event of flame failure is to be long enough to allow a stable flame to be established and detected under normal operational circumstances, but is to be set to minimise the quantity of oil fuel delivered to the furnace and the possibility of subsequent damage as a result of unintended ignition.
(b) The time interval between flame failure detection and closing of burner oil fuel valve(s) is to be long enough to prevent shutdown due to incorrect detection of a flame failure under normal operational circumstances, but is to be set to minimise the quantity of unburned oil fuel delivered to the furnace and the possibility of subsequent damage as a result of unintended ignition.

3.1.11 A warning notice is to be fitted in a prominent position at every oil burning unit local manual control station which specifies that burners operated with manual or local overrides in use are only to be ignited after sufficient purging of the furnace and of any additional precautions required when operating in this condition.

Part 5, Chapter 14 & Part 6 Chapter 1

~~3.7~~ ~~Top-fired boilers - Flame failure~~

~~*3.7.1* In the case of top-fired boilers, means are to be provided so that, in the event of flame failure, the oil fuel supply to the burners is shut off automatically, and audible and visual warnings are given. Any proposal to depart from this requirement in the case of small auxiliary top-fired boilers will be specially considered.~~

Existing sub-Sections 3.8 to 3.13 are to be renumbered 3.7 to 3.12.

CORRIGENDA

■ *Section 9*
Hydraulic systems

9.1 General

9.1.1 The arrangements for storage, distribution and utilisation of hydraulic and other flammable oils employed under pressure in power transmission systems, control and actuating systems and heating systems in locations where means of ignition are present, are to comply with the provisions of ~~2.8.1 to 2.8.3~~ 2.9.1 to 2.9.3, 4.3, 4.5, 4.11 and 4.17 where applicable.

Part 6, Chapter 1
Control Engineering Systems

Effective date 1 July 2007

■ *Section 3*
Control and supervision of unattended machinery

3.5 Main, auxiliary and other boilers

3.5.1 Alarms and safeguards are indicated in 3.5.2 to ~~3.5.4~~ 3.5.9 and Table 1.3.4.

3.5.3 Safety systems and overrides are to comply with the requirements of 2.4.9.

~~*3.5.3*~~ *3.5.4* Burner controls are to be arranged such that light-off is only possible at the minimum firing rate compatible with flame establishment. If ignition is set to occur at a fuel rich condition then the burner is to revert to the correct operating air/fuel ratio on establishment of a stable flame.

~~*3.5.4.*~~*3.5.5.* Where water level indicators are dependent upon an external power supply, the oil fuel supply to the burners is to be automatically shut off in the event of power or signal failure.

3.5.6 Arrangements are to be such that burner oil fuel valve(s) do not open:

(a) prior to completion of required warm up times for residual fuel oil; or

(b) when the power supply to the igniter has failed, as applicable; or

(c) until a pilot flame is established, as applicable; or

(d) prior to the completion of furnace purging, *see* Pt 5, Ch 14,3.1.7.

3.5.7 Arrangements for flame failure detection are to be provided with self-monitoring capabilities which ensure that the flame detector is not erroneously indicating the presence of a flame. In the event of failure being detected by these self-monitoring capabilities:

- an alarm is to be activated.

In the event of loss of flame detection capability for a burner;

- oil fuel to the burner is to be shut-off automatically; and
- an alarm is to be activated.

3.5.8 Where established as necessary by Pt 5, Ch 14, 3.1.8, means are to be provided to prevent starting of the ignition sequence following multiple flame failures until completion of the identified lock out period.

3.5.9 Following burner shutdown, the furnace is to be purged automatically for at least the required pre-purging time. In the event of shutdown due to activation of a required safeguard, this purging is to be manually initiated.

Table 1.3.4 Main, auxiliary and other boilers: Alarms and safeguards (*see continuation*)

Item	Alarm	Note
Water level*	Low	Two water level sensors are to be provided each to operate independently, and automatically shut-off the oil fuel to the burners and operate alarms, *see* Notes 1 to 3, and 5
Water level	1st stage high*	—
	2nd stage high	Where applicable ~~A~~ automatic closure of turbine steam inlet valves, *see* 3.1.4
Steam drum or superheater outlet pressure*	High and Low	—
Superheated steam temperature	High	—
De-superheated steam temperature*	High	—
Feed water forced circulation flow (if fitted)	Low	Oil fuel to burners to be shut-off automatically, *see* Note 5
Feed water pH	Low	When automatic dosing of feed water fitted
Feed water salinity	High	Fitted in boiler feed system
Feed water temperature	Low	When automatic temperature control fitted
Combustion air pressure*	Low	Oil fuel to burners to be shut-off automatically in operation or not released during start up, *see* Note 5. Purge sequence to be inhibited, *see* Pt 5, Ch 14, 3.1.7
Oil fuel pressure*	Low	—
Oil fuel temperature or viscosity*	High and Low	Heavy oil only
Oil fuel atomizing steam/air pressure	Low	—
Burner flame ~~and ignition~~*	Failure	Each burner to be monitored. Oil fuel to burner(s) to be shut-off automatically, *see* Pt 5, Ch 14, 3.1.9, 3.1.10 and ~~Note 4~~ Note 5
Flame monitoring device(s)*	Failure	*See* 3.5.7, and Note 5
Igniter power supply*	Failure	Each igniter to be checked before oil fuel is supplied to burner, *see* 3.5.6 and Note 5
Forced draft fan*	Power failure	Oil fuel to burners to be shut-off automatically in operation or not released during start up, *see* Note 5
Air registers and dampers (including those in the uptake)*	Not fully open	Purge sequence to be inhibited, *see* Pt 5, Ch 14, 3.1.7
Control system*	Power failure	Oil fuel to burners to be shut-off automatically. Control using alternative arrangements is to remain available, *see* 2.5.8
Uptake temperature	High	Where economizer and/or gas air heaters are integral with the boiler and also for independent extended surface exhaust gas boilers/economizers, to monitor for soot fires

NOTES *(part only shown)*

~~4. Combustion spaces are to be purged automatically before re-ignition takes place in the event of a flame-out on all burners.~~

~~5~~ 4. For boilers not supplying steam for propulsion or for services essential for the safety or operation of the ship at sea, only the items marked * are required.

5. These safeguards are to remain operative during automatic, manual and emergency operation.

3.6 Thermal fluid heaters

3.6.1 Alarms and safeguards are indicated in 3.6.2 ~~3.6.3~~ to 3.6.8 and Table 1.3.5.

3.6.2 The standby pumps for oil fuel and thermal fluid circulation are to start automatically when the discharge pressure from the working pump falls below a predetermined value. The standby pumps for thermal fluid circulation are to start before the shut-offs due to low thermal fluid pressure, *see* Table 1.3.5, are activated.

3.6.4 Burner controls are to be arranged such that light-off is only possible at the minimum firing rate compatible with flame establishment. If ignition is set to occur at a fuel rich condition then the burner is to revert to the correct operating air/fuel ratio on establishment of a stable flame.

3.6.5 Arrangements are to be such that burner oil fuel valve(s) do not open:

(a) prior to completion of required warm up times for residual fuel oil; or

(b) when the power supply to the igniter has failed, as applicable; or

(c) until a pilot flame is established, as applicable; or

(d) prior to the completion of furnace purging, *see* Pt 5, Ch 14,3.1.7.

3.6.6 Arrangements for flame failure detection are to be provided with self-monitoring capabilities which ensure that the flame detector is not erroneously indicating the presence of a flame. In the event of failure being detected by these self-monitoring capabilities:

- an alarm is to be activated.

In the event of loss of flame detection capability for a burner;

- oil fuel to the burner is to be shut-off automatically; and
- an alarm is to be activated.

3.6.7 Where established as necessary by Pt 5, Ch 14, 3.1.8, means are to be provided to prevent starting of the ignition sequence following multiple flame failures until completion of the identified lock out period.

3.6.8 Following burner shutdown, the furnace is to be purged automatically for at least the required pre-purging time. In event of shutdown due to activation of a required safeguard, this purging is to be manually initiated.

Table 1.3.5 Thermal fluid heaters: Alarms and safeguards

Item	Alarm	Note
Expansion tank level*	Low	Oil fuel burners to be shut-off automatically
Thermal fluid flow	Low	Oil fuel burners to be shut-off automatically
Thermal fluid pressure	Low	Oil fuel burners to be shut-off automatically
Thermal fluid outlet temperature*	1st stage high	—
	2nd stage high	Oil fuel burners to be shut-off automatically, *see* 3.1.4
Combustion air pressure*	Low	Oil fuel burners to be shut-off automatically in operation or not released during start up, *see* Note 3. Purge sequence to be inhibited *see* Pt 5, Ch 14, 3.1.7.
Oil fuel pressure*	Low	—
Oil fuel temperature or viscosity*	High and Low	Heavy oil only
Oil fuel atomizing steam/air pressure	Low	—
Burner flame* ~~and ignition~~	Failure	Each burner to be monitored. Oil fuel to burner~~s~~ to be shut-off automatically, *see* Pt 5, Ch 14, 3.1.9 and 3.1.10, and Note ~~1~~ 3
Flame monitoring device(s)*	Failure	*See* 3.6.6 and Note 3
Igniter power supply* checked	Failure	Each igniter to be before oil fuel is supplied to burner(s), *see* 3.6.5 and Note 3
Forced draft fan* released	Power failure	Oil fuel to burners to be shut-off automatically in operation or not during start up, *see* Note 3
Air register and dampers (including those in the uptake)*	Not fully open	Purge sequence to be inhibited, *see* Pt 5, Ch 14, 3.1.7.
Control system*	Power failure	Oil fuel to burners to be shut-off automatically. Control using alternative arrangements is to remain available, *see* 2.5.8.
Uptake temperature	High	Where applicable, to monitor for soot fires

NOTES

~~1. Combustion spaces are to be purged automatically before re-ignition takes place in the event of a flame-out on all burners.~~

~~2~~1. Special consideration may be given to the requirements for oil-fired hot water heaters.

2. For heaters not supplying thermal oil for services essential for the safety or the operation of the ship at sea, only the items marked* are required.

3. These safeguards are to remain operative during automatic, manual and emergency operation.

CORRIGENDUM

Table 1.3.6 Inert gas generators: Alarms and safeguards

Item	Alarm	Note
Inert gas outlet temperature	High	Oil fuel to burner to be shut-off automatically
Combustion air pressure	Low	Oil fuel to burner to be shut-off automatically
Oil fuel pressure	Low	—
Oil fuel temperature or viscosity	High and Low	Heavy oil only
Burner flame and ignition	Failure	Oil fuel to burner to be shut-off automatically, *see* Note 1
Cooling water pressure or flow	Low	Oil fuel to burner to be shut-off automatically
Cooling water temperature	High	—
Oil fuel supply	Insufficient	
Power supply to inert gas generator	Failure	Gas ~~relating~~ regulating valve is to be shutdown automatically
Automatic control system power supply	Failure	

NOTES
1. Combustion spaces are to be purged automatically before re-ignition takes place in the event of a flame-out on all burners.
2. *See also* Pt 5, Ch 15.

Part 6, Chapter 2
Electrical Engineering

CORRIGENDUM

■ *Section 2*
Main source of electrical power

2.2 Number and rating of generators and converting equipment

2.2.1 Under sea-going conditions, the number and rating of service generating sets and converting sets, such as transformers and semi-conductor converters, when any one generating set or converting set is out of action, are:

(a) to be sufficient to ensure the operation of electrical services for essential equipment, habitable conditions, cargo refrigeration machinery of ships having a **RMC** notation and the container socket outlets and ventilation system of container ships having a ~~**CRCH**~~ **CRC** notation. *See* 15.2.5 for electric propulsion systems;

(b) to have sufficient reserve capacity to permit the starting of the largest motor without causing any motor to stall or any device to fail due to excessive voltage drop on the system;

(c) to be capable of providing the electrical services necessary to start the main propulsion machinery from a dead ship condition. The emergency source of electrical power may be used to assist if it can provide power at the same time to those services required to be supplied by Section 3, *see also* 2.3.2.

Cross-references

Section numbering in brackets reflects any Section re-numbering necessitated by any of the Notices that update the current version of the Rules for Ships.

Part 5, Chapter 13

1.3.1 Reference to 3.10.1 *now reads* 3.9.1.

Part 5, Chapter 14

3.12.1 ***(3.11.1)*** Reference to 3.11 *now reads* 3.10
11.1.2.a Reference to 3.11.2 *now reads* 3.10.2

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